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REMARKS

By way of this amendment, claims 1, 5, 8, 12, 15 and 18 have been amended, and new claims 21-23 are added. Accordingly, claims 1-23 are present in this application. Applicants request reconsideration and allowance of the present application.

In the Office Action, claims 1, 5, 15 and 18 were rejected under 35 U.S.C. §102(b) as being anticipated by Goth et al. (U.S. Patent No. 5,005,638). Applicants have amended the independent claims 1, 8 and 15 to recite that the pivot area is a substantially semi-spherical pivot area as disclosed in paragraph [0017] of Applicants' specification and shown in the drawing figures, and respectfully submit that claims 1, 5, 15 and 18, as amended, are not anticipated by the Goth et al. patent for the reasons discussed below.

The Goth et al. patent discloses a multi-chip circuit module also referred to as a thermal conduction module (TCM) that employs "barrel shaped" pistons to provide improved cooling for chips that may be tilted. The thermal conduction module of Goth et al. includes barrel shaped pistons 22 located in generally rectangular blind holes 24 of a hat 19 that includes a channel 36 for receiving chilled water for cooling purposes. The Goth et al. module employs a spring 26 disposed between the top of each barrel shaped piston 22 and the aligned blind hole 24 to urge the piston 22 downward in contact with the upper surface 27 of a chip. The top surface of the barrel shaped piston 22 is therefore not intended to come into contact with the upper wall of blind hole 24, but instead abuts springs 26 which allows for tilt of the barrel shaped piston 22 to accommodate tilt of the underlying chip.

In contrast, Applicants' claimed invention, as recited in claim 1, as amended, is directed to a thermally enhanced electronic module having a thermally conductive case, a self-aligning thermally conductive heat sink, and a die. The case includes a substantially semi-spherical pivot area with a first shape formed into the case for receiving a first portion of the heat sink. Additionally, the first portion of the heat sink has a second shape that is complimentary to the first shape. The die has a first surface and a second surface opposite the first surface. The die is mounted to a substrate with the first surface of the die facing the substrate. The second surface of the die is in thermal contact with the heat sink. Method

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claim 15 recites a method of manufacturing a thermally enhanced electronic module that includes the step of forming a substantially semi-spherical pivot area.

In order to anticipate a claim, the reference must teach each and every limitation of the claim. Nowhere does Goth et al. disclose an electronic module or method having a substantially semi-spherical pivot area in a thermally conductive case, with the pivot area having a first shape formed into the case for receiving a first portion of a self-aligning thermally conductive heat sink, and wherein the first portion of the heat sink has a second shape that is complimentary to the first shape, as recited in independent claims 1 and 15, as amended.

Instead, the Goth et al. thermal conduction module employs a piston that is "barrel shaped" with a slightly tapered upper wall leading to a flat top and disposed within a rectangular blind hole 24. The barrel shaped piston 22 is able to pivot within blind hole 24 due to the presence of a spring 26 interdisposed between the piston 22 and blind hole 24. Thus, Goth et al. requires the presence of a spring 26 between the blind hole 24 and the piston 22, and clearly does not disclose a substantially semi-spherical pivot area with first and second shapes that are complimentary of each other.

Accordingly, Applicants submit that independent claims 1 and 15, as amended, are not anticipated by Goth et al., and the rejection of claims 1, 5, 15 and 18 under 35 U.S.C. §102(b) as anticipated by Goth et al., should therefore be withdrawn, which action is respectfully solicited.

Additionally, claims 2-4, 6-14, 16, 17, 19 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Goth et al. Applicants likewise submit that the aforementioned claims would not have been rendered obvious in view of Goth et al., for the following reasons.

With regard to claim 8, Applicants submit that Goth et al. fails to teach or even suggest an electronic module having a substantially semi-spherical pivot area with first and second shapes formed in the case and the heat sink, and the first and second shapes being complimentary to one another as recited in claim 8, as amended. As discussed above, Goth et al. employs a barrel shape piston disposed within a blind hole that requires a spring 26

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disposed between the piston and the blind hole to achieve the pivoting action. The Goth et al. pivot area clearly is not substantially semi-spherical, and does not have complimentary first and second shapes. Nowhere does Goth et al. teach, suggest or otherwise motivate one of ordinary skill in the art to employ a substantially semi-spherical pivot area having the first and second shaped complimentary portions as recited in claim 8, as amended. As to the remaining dependent claims rejected under 35 U.S.C. §103(a) in view of Goth et al., Applicants submit that these claims depend upon independent claims 1, 8 and 15, which should be allowable for the reasons discussed above with respect to the independent claims.

Finally, claims 3, 4, 10, 11, 16 and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Goth et al. in view of Tajima (JP-362109347 A). Applicants submit that each of these claims are dependent upon an independent claim, which should be allowable for the reasons discussed above in connection with the rejection of independent claims 1, 8 and 15. Applicants submit that Tajima does not teach or otherwise suggest an electronic module or method employing a substantially semi-spherical pivot area as recited in the independent claims, as amended, nor does Tajima makeup for the deficiencies of Goth et al., and these claims should likewise be allowable.

By way of the foregoing amendments and discussion, Applicants have demonstrated that the claims, as amended, are not anticipated by Goth et al. nor rendered obvious in view of Goth et al. alone or further in combination with Tajima, and the rejections of the claims under 35 U.S.C. §102(b) and §103(a) should therefore be withdrawn.

Applicants have further added new claims 21-23, each of which further recites an elastomer material disposed between the substrate and the thermally conductive case. New claims 21-23 depend from the independent claims 1, 8 and 15, respectively, and should be allowable for the reasons discussed above.

The remaining prior art made of record in the present application was not applied to the claims. Applicants have reviewed these references and agree with the Examiner that such references do not teach or suggest Applicants' claimed invention.


In view of the above remarks, it is submitted that claims 1-23 define patentable subject matter and are in condition for allowance, which action is respectfully solicited. If the

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Examiner has any questions regarding the patentability of any of the claims, the Examiner is encouraged to contact Applicants' undersigned attorney at the Examiner's convenience.

Respectfully submitted,

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